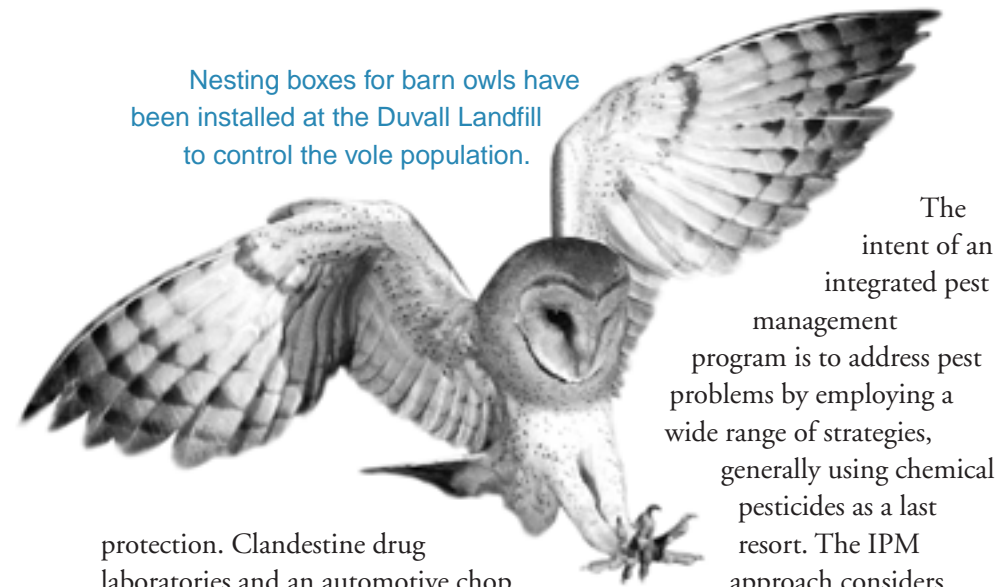


Nesting boxes for barn owls have been installed at the Duvall Landfill to control the vole population.



protection. Clandestine drug laboratories and an automotive chop shop have impacted the area. The County hopes to leverage more than \$1,000,000 in funding for this project through the U.S. Army Corps of Engineers. Enhancing open spaces that are habitat for birds and other animals supports the County's goals and policies for open space and habitat preservation.

### **Integrated Pest Management**

County Executive Ron Sims issued an Integrated Pest Management (IPM) Executive Order in November 1999, requiring that all departments develop and implement IPM programs for their own internal operations. As a result, the Solid Waste Division implemented an IPM program in early 2000 and continues to improve techniques and strategies to manage pests and plants without chemicals.

The intent of an integrated pest management program is to address pest problems by employing a wide range of strategies, generally using chemical pesticides as a last resort. The IPM approach considers

impacts of management methods on the environment and public health. The Solid Waste Division has reduced the amount of pesticides that we use by increasing manual methods of vegetation management. In addition, the Division has written Draft Best Management Practices that will be adopted in the later part of 2001.

An example of an IPM strategy that the Division has implemented is the installation of nesting boxes for owls at the Duvall Landfill to control the vole population. The voles have been damaging the poplar tree vegetative cover planted in the spring of 2000. Barn owls should be attracted to the boxes for nesting or roosting. Perching poles will be constructed and installed next to enhance the owl's hunting techniques.

### **NEW Gas to Energy Project**

The Cedar Hills Regional Landfill, owned and operated by King County, is the only landfill in the County that is currently active. Each day it generates approximately 14-million cubic feet of landfill gas (LFG) - enough to fuel a 22- to 26-megawatt power generation facility that could produce the energy to power about 60,000 homes. The LFG, produced by the anaerobic decomposing of organic wastes, consists of methane, carbon dioxide, and traces of other compounds. The gas is currently collected at the landfill using a series of wells, trenches, and piping, and then burned off using a system of flares.

The Division is currently seeking a developer to transfer the LFG to a generation facility either on or off the landfill property. There is high interest among both public and private energy companies and utilities. When implemented, the new facility would become the fourth largest LFG energy generation facility in the nation.

The project will not only generate revenue for the County, but will also convert the LFG - a waste - to a green resource that produces energy. The next annual report should have much more information on this developing project.



## Facility Improvements

The Solid Waste Division operates King County's transfer and disposal system. The system is comprised of a regional landfill, eight transfer stations, and two rural drop boxes for residential and non-residential self-haul customers and commercial haulers.

The past year has been a year for preparation of upcoming major capital projects and completing various small to medium capital projects. A total of 95 improvement and safety projects have been completed or substantially completed from July 2000 to June 2001. These projects were handled in a manner so as to cause the least disruption to service while making necessary improvements to our facilities.

These are some of the major projects in the reporting period and how they impacted operations:

- The Houghton scalehouse and infrastructure repair project required the Division to limit the use of the station and to manage traffic so as not to impact the construction.

- The Bow Lake pit repair project required that the transfer station be closed for approximately one month to repair the concrete in the pit where the solid waste is received. While the recycling area remained open, all other traffic had to be diverted to other County transfer stations.
- Final closure of Area 4 at the Cedar Hills Landfill was completed. The phased closure began in 1997 and included installation of final cover, new landfill gas collection, and new leachate and storm water management facilities.
- Planning for Area 6 is underway with the Division hiring a consultant to plan the new cell. Area 6 is scheduled to open in about 2005.

Over the coming years, several major capital projects are planned that will implement the *Final 2000 Comprehensive Solid Waste Management Plan* and prepare the solid waste system for eventual waste export. Some of the major projects planned include the construction of a new transfer station at Factoria, safety improvements, and new roofs for several transfer stations.

### New Fund Created for Capital Improvements at Transfer Stations

The Division completed initial financial preparations to fund capital improvements at the County's six urban transfer stations during this planning period.

Reserves totaling \$19.6 million





were transferred to the new Solid Waste Construction Fund. The transfers included \$8.8 million from a future capital facilities reserve within the Landfill Reserve Fund and \$9.8 million from a rate stabilization reserve within the Solid Waste Operating Fund.

Construction Fund reserves will now be sufficient to fund the transfer system capital improvement program through the end of 2003. When these reserves are depleted, current plans call for using a combination of general obligation bonds and transfers from the solid waste operating fund to pay for planned capital improvements through 2012.

Solid waste tip fees are the ultimate funding source for all transfer system capital expenditures. Ongoing financial planning is required to make sure the County can maintain stable rates, provide adequate funding for capital improvements, and meet other financial objectives as well.

## **Environmental Monitoring at Cedar Hills Landfill**

The Division conducts extensive environmental monitoring at Cedar Hills, which is designed to detect and assess environmental impacts of site activities.

Monitoring activities include sampling and analysis of water from 46 groundwater monitoring wells, 4 domestic water supply wells, 9 surface water stations, and 4 wastewater monitoring stations. Additional depth-to-groundwater and surface water flow data are collected from 8 wells and 13 surface water gauging stations. Division staff also monitor approximately 53 gas probes

## **Custodial Landfills**

The Division has custodial responsibility for 10 closed landfills within King County - Bow Lake,

Cedar Falls, Corliss, Duvall, Enumclaw, Hobart, Houghton, Puyallup/Kit Corner, South Park, and

Vashon. The primary responsibility of the Division is to conduct environmental monitoring of groundwater, surface water, wastewater, and gas. We also maintain cover and manage landfill gas and wastewater. Tests of more

than 101 groundwater, surface water, and wastewater monitoring stations and approximately 100 gas-monitoring sites are conducted throughout the year.

Data from Cedar Hills are summarized in reports to the U.S. Environmental Protection Agency. Data from both Cedar Hills and the closed landfills are reported to the Washington State Department of Ecology and Public Health - Seattle and King County. These reports are available to the public at King County Public Libraries.

*88% of those residents surveyed in the Division's Residential Waste Reduction and Recycling Survey say they have garbage picked up at their home by a garbage service. 39% of residents surveyed also say they have taken their garbage to a transfer station.*



# Planning for the Future

## Monitoring for Future Waste Export

King County Ordinance 12378 directs the Solid Waste Division “to monitor and analyze conditions impacting the appropriateness, feasibility, and timing of waste export on a continuous basis, and to regularly report to the Council on such conditions.”

In 1995, the Division developed a comprehensive model to evaluate the economics of waste export. At that time the analysis showed that exporting waste before the Cedar Hills Regional Landfill is full (reaches capacity) is not cost-effective. Partial export - exporting waste from any of the Division’s transfer stations - was also found to be not cost-effective. Every year since then the Division has re-examined the assumptions of the analysis and found them still valid, leading to the same conclusion.

The *Final 2000 Comprehensive Solid Waste Management Plan* contains an analysis of the costs of closing Cedar Hills and moving to waste export prior to the expected date when Cedar Hills reaches

capacity. The analysis found that early closure and waste export would be very costly to ratepayers, due to the costs of long-haul transport relative to using Cedar Hills. Over the next year, the Division will begin a detailed analysis (replacing the model developed in 1995) as part of the preparation for moving to waste export. This analysis will assist in the transition planning for waste export and help with the development of our implementation plan.

## Solid Waste Projections

Solid waste forecasts are required for the Division’s operation. They are used in long-range planning for transfer and disposal systems, and in preparing annual budgets, setting disposal rates, and measuring the effectiveness of waste reduction and recycling programs.

The Division uses an econometric model to forecast future waste tonnage. The model takes into account several variables including the disposal tip fee, per capita income, employment, and population. Forecasts produced by this model are then adjusted to take into account program changes.

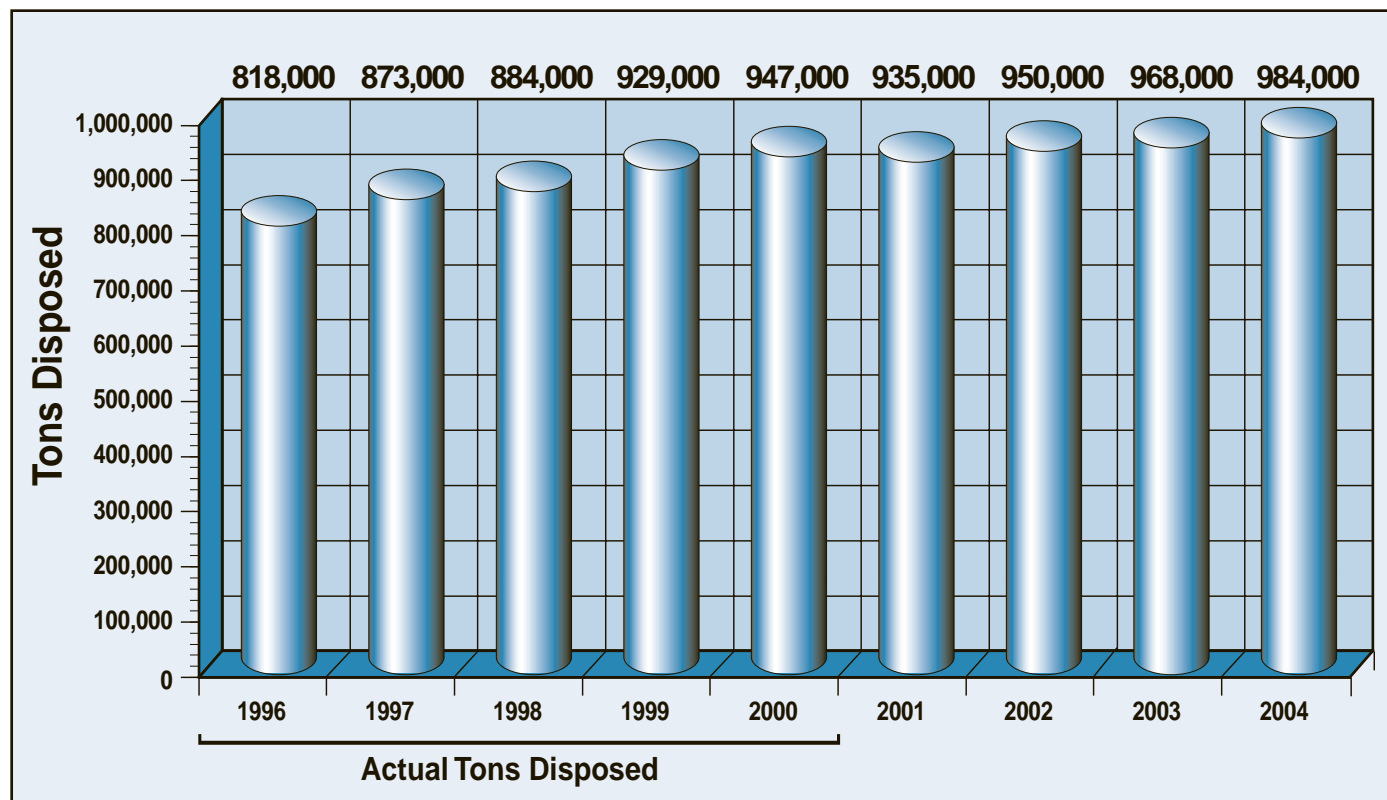
In 2000, 947,000 tons of solid waste was disposed in the Cedar Hills Regional Landfill. This represented an



Tonnage is forecasted to remain flat in 2002 and grow only modestly over the next few years.



**Figure 4-1.** Projected Disposal Through 2004



increase of 2% in tonnage from 1999, due in part to economic growth that began to level off in mid-2000. From 1999 to 2000, population in the Puget Sound region grew 1.3%, employment 2.4%, and personal income 4.9%.

Tonnage data through July 2001

reflect a significant leveling off in the rate of disposal tonnage; tonnage received through July 2001 is about 2% lower than that received in the same period in 2000. A significant slowdown in economic growth is felt to be largely responsible for this decline in tonnage. Economic growth

in the region is anticipated to continue to slow in 2002, reflecting national economic trends and associated regional impacts, such as significant projected Boeing layoffs. As a result, tonnage is forecast to remain flat in 2002 and grow only modestly over the next few years.

# Appendix

The following appendix tables provide 2000 solid waste reference data.

**Table A-1.** 2000 Population and Housing Data\*

Area	Census 2000	Single Family Units	Multi-Family Units	Mobile Home
<b>Unincorporated</b>	349,773	106,420	20,328	9,258
<b>Incorporated</b>	823,887	192,545	140,644	10,876
<b>Total</b>	<b>1,173,660</b>	<b>298,965</b>	<b>160,972</b>	<b>20,134</b>

\*Sources: 2001 King County Annual Growth Report, 2000 U.S. Census

**Table A-2.** Single-Family (1-4 units)  
Curbside Collection - Service Subscribers

Area	Curbside Garbage and Recycling <sup>(1)</sup>	Curbside Yard Waste
<b>Unincorporated</b>	84,409	32,086
<b>Incorporated</b>	173,946	105,509
<b>Total</b>	<b>258,355</b>	<b>137,595</b>

(1) All garbage customers have also been counted as recycling customers.

**Table A-3.** Single-Family (1-4 units)  
Curbside Collection - Average Pounds per Month

Area	– Pounds Per Household Per Month –		
	Garbage	Recycling	Yard Waste
<b>Unincorporated</b>	149	69	149
<b>Incorporated</b>	131	55	110
<b>Average</b>	<b>140</b>	<b>62</b>	<b>130</b>

**Table A-5.** 2000 Transfer Station and

Facility	1st Qtr.
<b>Factoria</b>	39,396
<b>Houghton</b>	43,097
<b>Renton</b>	15,077
<b>Algona</b>	20,321
<b>Bow Lake</b>	30,877
<b>First Northeast</b>	13,185
<b>Enumclaw</b>	4,703
<b>Vashon</b>	2,148
<b>Cedar Falls Drop Box</b>	827
<b>Skykomish Drop Box <sup>(3)</sup></b>	320
<b>Total</b>	<b>169,631</b>

(3 ) Skykomish drop box refuse is delivered to the Houghton

**Table A-4.** 2000 Curbside Residential and Non-Residential Recycling Tonnage

Type		Mixed Paper	News-paper	Card-board	Glass	Tin & Steel	Alum-inum	Plastic	Polycoated Paper	Yard Waste	Total
<b>Residential</b>	Unincorp.	17,465	9,122	5,193	5,984	875	361	4,086	22	28,633	71,741
	Incorp.	33,310	24,098	4,116	10,164	1,479	668	1,333	24	70,179	145,371
	<b>Subtotal</b>	<b>50,775</b>	<b>33,220</b>	<b>9,309</b>	<b>16,148</b>	<b>2,354</b>	<b>1,029</b>	<b>5,419</b>	<b>46</b>	<b>98,812</b>	<b>217,112</b>
<b>Non-Residential<sup>(2)</sup></b>	Unincorp.	2,889	354	1,082	281	185	47	74	0	867	5,779
	Incorp.	17,833	1,674	17,509	1,723	832	249	387	3	4,427	44,635
	<b>Subtotal</b>	<b>20,722</b>	<b>2,027</b>	<b>18,591</b>	<b>2,004</b>	<b>1,017</b>	<b>296</b>	<b>461</b>	<b>3</b>	<b>5,294</b>	<b>50,415</b>
	<b>Total</b>	<b>71,497</b>	<b>35,247</b>	<b>27,900</b>	<b>18,152</b>	<b>3,371</b>	<b>1,325</b>	<b>5,880</b>	<b>49</b>	<b>104,106</b>	<b>267,527</b>

(2) Non-residential data includes data submitted to the County by the commercial haulers. It does not include recycling numbers from independent haulers and, therefore, may be under-reported.

### Drop Box Refuse Tonnage Disposed

2nd Qtr.	3rd Qtr.	4th Qtr.	Total
42,198	42,615	39,866	164,075
46,153	45,541	39,834	174,625
17,186	18,287	15,762	66,312
24,163	29,223	28,675	102,382
34,189	21,281	27,521	113,868
15,047	15,178	13,105	56,515
5,375	5,985	5,026	21,089
2,306	2,417	1,956	8,827
1,065	1,144	836	3,872
280	215	240	1,055
<b>187,682</b>	<b>181,671</b>	<b>172,581</b>	<b>711,565</b>

transfer station. Tonnage figures from Skykomish are included in the Houghton tonnage total.

Nearly 80% of single family homes use curbside recycling services (as reported in the Division's Residential Waste Reduction and Recycling Survey).

**Table A-6.** 2000 Total Tonnage Disposed

System Origin	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Total
Transfer System	169,631	187,682	181,671	172,581	711,565
Cedar Hills Regional Direct	50,508	53,891	52,587	59,183	216,169
Cedar Hills Other Waste	4,484	4,720	5,399	4,837	19,440
<b>Total Cedar Hills Disposal</b>	<b>224,623</b>	<b>246,293</b>	<b>239,657</b>	<b>236,601</b>	<b>947,174</b>
Yard Waste Recycled	228	506	417	169	1,320

**Table A-7.** 2000 Transfer Station Disposal by Customer Type

Transfer Station	SELF HAUL CUSTOMERS		COLLECTION COMPANIES	
	Tons Disposed	% of Total	Tons Disposed	% of Total
<b>Factoria</b>	31,966	19%	132,109	81%
<b>Houghton</b>	29,995	17%	144,630	83%
<b>Renton</b>	16,075	24%	50,237	76%
<b>Algona</b>	31,236	31%	71,146	69%
<b>Bow Lake</b>	27,927	25%	85,941	75%
<b>First Northeast</b>	31,978	57%	24,537	43%
<b>Enumclaw</b>	10,314	49%	10,775	51%
<b>Vashon</b>	6,355	72%	2,472	28%
<b>Cedar Falls Drop Box</b>	3,872	100%	0	0%
<b>Total</b>	<b>189,718</b>	<b>27%</b>	<b>521,846</b>	<b>73%</b>

**Table A-8.** 2000 Transfer Station Transactions by Customer Type

Transfer Station	SELF-HAUL CUSTOMERS		COLLECTION COMPANIES	
	Transactions	% of Total	Transactions	% of Total
<b>Factoria</b>	104,092	83%	21,927	17%
<b>Houghton</b>	102,079	80%	26,304	20%
<b>Renton</b>	68,856	90%	7,782	10%
<b>Algona</b>	121,389	89%	14,942	11%
<b>Bow Lake</b>	89,733	84%	16,761	16%
<b>First Northeast</b>	114,511	96%	4,716	4%
<b>Enumclaw</b>	43,773	95%	2,080	5%
<b>Vashon</b>	21,699	98%	457	2%
<b>Cedar Falls Drop Box</b>	19,972	100%	0	0%
<b>Total</b>	<b>686,104</b>	<b>88%</b>	<b>94,969</b>	<b>12%</b>

**Table A-9.** 2000 Transfer Station and Drop Box Recycling Tonnage

Site	Mixed Paper	Newspaper	Cardboard	Tin, Aluminum Plastic, Glass	Total
<b>Factoria</b>	167	49	127	59	402
<b>Houghton</b>	259	94	240	109	702
<b>Renton</b>	347	51	164	159	721
<b>Bow Lake</b>	322	53	159	157	691
<b>First Northeast</b>	448	78	278	254	1,058
<b>Enumclaw</b>	227	188	80	196	691
<b>Vashon</b>	151	46	151	345	693
<b>Cedar Falls Drop Box</b>	192	29	91	113	425
<b>Skykomish Drop Box</b>	14	2	3	16	35
<b>Snoqualmie Drop Box</b>	19	3	18	17	57
<b>Total</b>	<b>2,146</b>	<b>593</b>	<b>1,311</b>	<b>1,425</b>	<b>5,475</b>

**Table A-10.** Total Refuse Tonnage

Year	Rural Landfills
<b>1980</b>	54,827
<b>1981</b>	44,280
<b>1982</b>	33,890
<b>1983</b>	32,318
<b>1984</b>	33,649
<b>1985</b>	36,862
<b>1986</b>	39,053
<b>1987</b>	36,979
<b>1988</b>	38,655
<b>1989</b>	41,614
<b>1990</b>	44,290
<b>1991</b>	28,553
<b>1992</b>	23,656
<b>1993</b>	21,020
<b>1994</b>	10,288
<b>1995</b>	7,388
<b>1996</b>	7,766
<b>1997</b>	8,110
<b>1998</b>	8,228
<b>1999</b>	3,949
<b>2000</b>	0



Disposed, 1980-2000

Transfer Stations	Cedar Hills Reg. Direct	Cedar Hills Other Waste	Total Disposed
460,577	218,560	35,756	769,720
509,680	244,417	50,755	849,132
519,931	213,715	24,943	792,479
498,643	206,691	9,566	747,218
527,522	256,459	10,512	828,142
568,342	268,795	13,592	887,591
624,247	272,485	22,345	958,130
681,472	595,058	28,165	1,341,674
667,651	556,247	39,954	1,302,507
712,156	476,602	55,462	1,285,834
848,439	483,950	58,105	1,432,869
814,919	258,319	53,014	1,181,969
770,448	119,340	21,317	933,489
716,437	144,973	24,740	901,217
633,408	150,400	22,422	814,384
642,498	146,024	26,610	822,520
594,736	190,790	23,740	817,602
607,256	229,007	24,448	872,384
626,874	226,617	22,005	883,724
692,921	214,422	18,015	929,307
711,565	216,169	19,440	947,174

**Table A-11.** 2000 Program Inquiries by Type

Phone Inquiries	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Total
<b>Composting/Recycling</b>	1,237	1,415	1,383	1,208	5,243
<b>City of Seattle referrals</b>	554	631	502	516	2,203
<b>Special Collection Events</b>	167	672	480	38	1,357
<b>Home Page Inquiries</b>	278	324	355	267	1,224
<b>Complaints</b>	1	3	5	2	11
<b>Customer Service<sup>(4)</sup></b>	3,216	3,839	3,773	3,309	14,137
<b>Mower Events</b>	161	78	n/a	n/a	239
<b>Compost Bin Event</b>	n/a	n/a	419	n/a	419
<b>Computer Recovery Project</b>	n/a	n/a	311	201	512
<b>Total</b>	<b>5,614</b>	<b>6,962</b>	<b>7,228</b>	<b>5,818</b>	<b>25,622</b>

(4) Customer Service includes inquiries such as: directions to transfer stations, rates, hours, acceptance of materials, how to get collection service, what hauler serves a particular area, etc.

## Publications

During the reporting period, the Solid Waste Division published several reports and documents. Many more brochures and resource guides, published in previous years and not listed here, are available from the Division and can be found on our website at <http://dnr.metrokc.gov/swd/> or by calling 206-296-6542.

Final 2000 Comprehensive Solid Waste Management Plan

Organic Materials Management Feasibility Study, April 2001

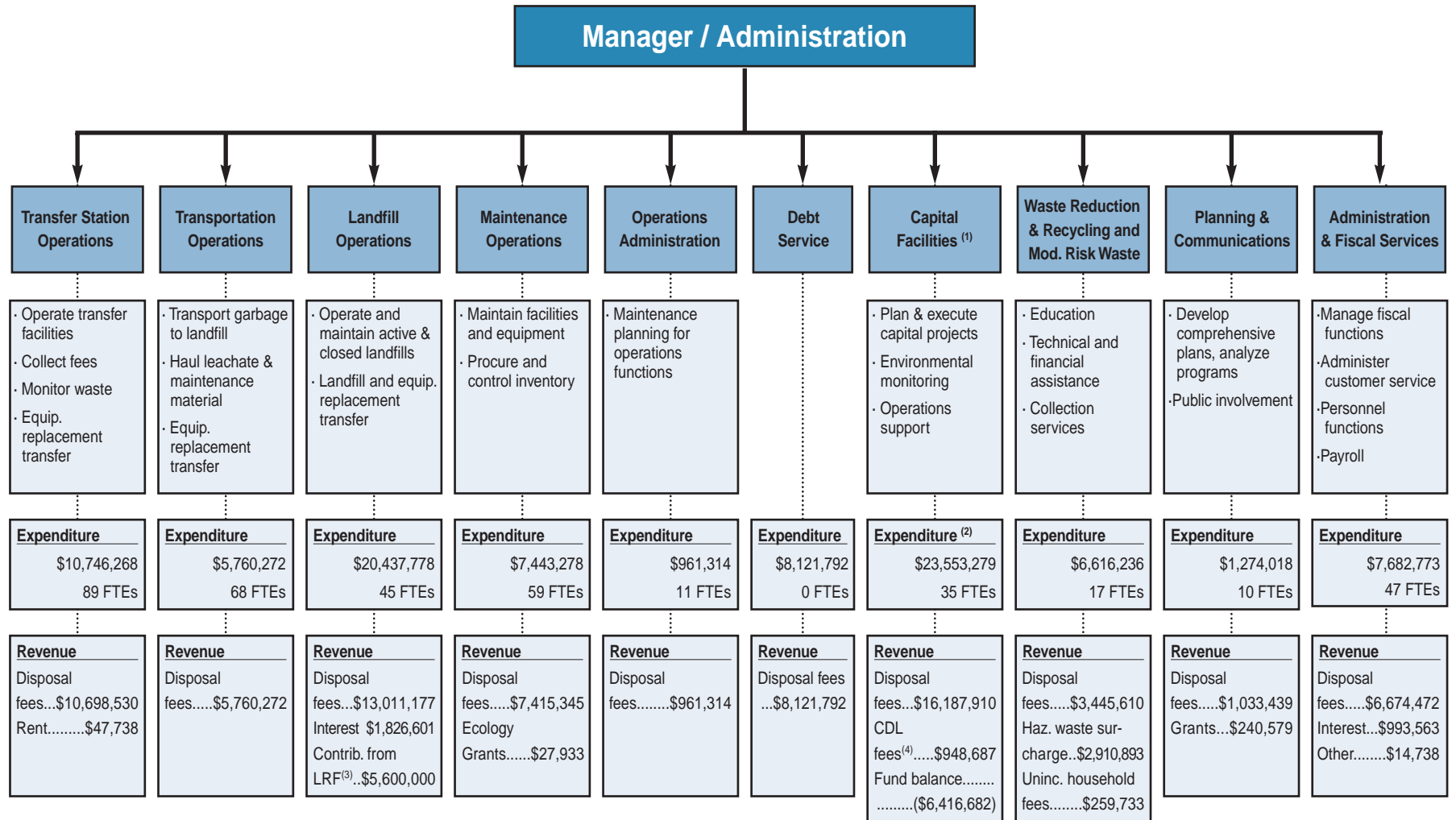
Programs for Educators, 2000 - 2001 School Year Edition

The Green Business Directory, 2001 "A consumer guide to environmentally sound business"

Waste Monitoring Program - 2000 Customer Satisfaction Surveys and Hauler Interviews, Final Report. December 2000.

Residential Waste Reduction and Recycling Survey, 2000

**Chart A-1. Solid Waste Division Actual Revenues and Expenditures. Year ending 12/31/2000.**



**Summary of 2000 Actual Activity**

2000 Total Revenues.....\$86,180,326  
Fund Balance Used.....\$ 6,416,682  
2000 Total Operating Expenditures.....\$92,597,008  
2000 Total Employees.....381 FTEs

(1) Operating portion only of capital facilities budget; does not include debt-financed design/construction costs.

(2) Includes payments for legal settlements.

(3) LRF=Landfill Reserve Fund

(4) Supports Construction, Demolition and Landclearing Program costs in Engineering Section.

# Acknowledgements

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Ron Sims

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This material will be provided in alternative formats for individuals with disabilities upon request.

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